WEST Search History

DATE: Tuesday, September 02, 2003

Set Name side by side	Query	Hit Count	Set Name result set
DB=PGPB,JPAB,EPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR			
L14	L13 not l10	23	L14
L13	(schedul$ with simulat$) and ((acd or contact$ or call$) with distribut$)	23	L13
L12	(schedul$ with simulat$) and @pd<=20000214 and ((acd or contact$ or call$) with distribut$)	0	L12
DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=OR			
L11	L10 not l6	1	L11
L10	L9 and ((acd or contact$ or call$) with distribut$)	4	L10
L9	L8 and l1	44	L9
L8	L2 or ((705/26 |705/27)!.CCLS.)	1888	L8
L7	L6 not l4	1	L7
L6	L3 and ((acd or contact$ or call$) with distribut$)	3	L6
L5	L3 and ((acd or (contact$ or call$)) with distribut$)	3	L5
L4	L3 and (acd or (automatic$ with call$ with distribut$))	2	L4
L3	L2 and l1	42	L3
L2	((705/7 |705/8 |705/9)!.CCLS.)	912	L2
L1	(schedul$ with simulat$) and @ad<=20000214	748	L1

END OF SEARCH HISTORY

09/504330

Generate Collection | Print

L14: Entry 9 of 23 File: PGPB Mar 20, 2003

PGPUB-DOCUMENT-NUMBER: 20030054843
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20030054843 A1

TITLE: Systems and methods for dimensioning a wireless communication system

PUBLICATION-DATE: March 20, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
Notani, Rajesh	San Diego	CA	US	
Sarraffe, Paul	Carlsbad	CA	US	

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	COUNTRY	TYPE CODE
Telefonaktiebolaget LM Ericsson				02

APPL-NO: 09/ 825133 [PALM]
DATE FILED: April 2, 2001

RELATED-US-APPL-DATA:
Application is a non-provisional-of-provisional application 60/236927, filed September 28, 2000,

INT-CL: [07] H04 Q 7/20

US-CL-PUBLISHED: 455/466
US-CL-CURRENT: 455/466

REPRESENTATIVE-FIGURES: 2

ABSTRACT:

A method of dimensioning a wireless communication system configured to support a plurality of applications. The method includes, for each application, estimating a percentage of subscribers of the wireless communication system that will use the application. Then a subscriber profile is determined for the application based at least in part on the estimated percentage of subscribers that will use the application. Then a busy hour traffic per subscriber ratio is determined for the application based at least in part on the subscriber profile for the application.

Automazione, No. 145, Milan, Italy. (and English translation), Jan. 1975.

ART-UNIT: 275

PRIMARY-EXAMINER: MacDonald; Allen R.

ASSISTANT-EXAMINER: Kanof; Pedro

ATTY-AGENT-FIRM: Alkov; Leonard A. Schubert; William C. Lenzen, Jr.; Glenn H.

ABSTRACT:

A computer-implemented process simulation method or tool that uses a software engine that calculates resources required to complete a project based upon contents of user-defined benefit-trade matrices associated with substeps of the project and design requirement priority values and a sample design whose process is to be simulated. Design requirement priority values and the sample design are input. Each substep is defined using a benefit-trade matrix that comprises a multiple variable lookup table that embodies history data relating to the substep. Each matrix includes relative weights of schedule, cost and risk elements for the substep and user-input rating values corresponding to the importance of each element. A logical equation is defined for each substep that computes the time required to complete the project, required resources for the project, and cost of the project based upon data input thereto. Weights for schedule, cost and risk elements of each benefit-trade matrix, and rating values for schedule, cost and risk elements of each benefit-trade matrix are input by a user. Output vectors for each benefit-trade matrix that comprise values corresponding to the respective weight of each element times the respective rating value of each element are computed. At each substep, resources required to complete the project are calculated using the vector derived from the benefit-trade matrix associated with the substep, and the design requirement priority values and predefined elements or vector derived from the benefit-trade matrix associated with a previous substep.

2 Claims, 3 Drawing figures

WEST

Generate Collection Print

L6: Entry 1 of 6 File: USPT Jul 11, 2000

DOCUMENT-IDENTIFIER: US 6088678 A
**** See image for Certificate of Correction ****
TITLE: Process simulation technique using benefit-trade matrices to estimate schedule, cost, and risk

Application Filing Date (1):
19960409

Brief Summary Text (3):
One conventional process simulation tool made by Perceptronics, but no longer available, is known as a Computer Aided Concurrent Engineering/Project Management (CACE/PM) tool. This tool has a computer "engine" that processes user-entered requirement information including resources required for a project, such as people, tools, and machines, and user-input estimates of times required for individual substeps or tasks of the project, and predicts or calculates the time required to complete the project. The tool computes a series of time delays at each substep and outputs the time required to complete the project based upon the requirements and available resources. In the event that it is determined that there are not enough resources available to complete the project at a particular substep, the simulation stops until changes are made to the either the requirements, the resources, or the time allocated to perform the substeps that permit complete calculation of the time duration of the project.

Brief Summary Text (5):
Presently available process simulation tools, such as the Perceptronics process simulation tool, may input estimated schedule, cost, and risk information at the start of a simulation, but this information is not updated during the simulation. Furthermore, there are no known simulation tools that provide data indicative of the risks associated with updates made during the simulation. In addition, there are currently no known process simulation techniques or tools that use benefit-trade matrices during process simulation.

Detailed Description Text (8):
The tool 10 then runs the simulation by predicting or calculating the time required to complete the entire project. The tool 10 computes a series of time delays at each substep 14, 15, 16, 17a, 17b, 18 and outputs the time required to complete the project based upon the requirements and available resources, and the simulation ends 19. In the event that it is determined that there are not enough resources available to complete the project at a particular substep 14, 15, 16, 17a, 17b, 18, the simulation stops at the appropriate event 13a-13f until changes are made to the requirements, the resources, or the time allocated to perform the substeps 14, 15, 16, 17a, 17b, 18 that permits complete calculation of the time duration of the project.

Current US Original Classification (1):
705/8

Current US Cross Reference Classification (1):
705/7

Current US Cross Reference Classification (2):
705/9

WEST

Generate Collection Print

L6: Entry 2 of 6 File: USPT May 2, 2000

US-PAT-NO: 6058370
DOCUMENT-IDENTIFIER: US 6058370 A

TITLE: Method of forecasting ambulance service demand

DATE-ISSUED: May 2, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Church; Richard L.	Santa Barbara	CA	93111	
Sorensen; Paul A.	Santa Barbara	CA	93111	

APPL-NO: 09/ 144738 [PALM]
DATE FILED: September 1, 1998

INT-CL: [07] G06 F 17/60

US-CL-ISSUED: 705/10; 705/705, 705/5, 705/7, 705/8, 705/9, 705/10, 701/1
US-CL-CURRENT: 705/10; 701/1, 705/5, 705/7, 705/8, 705/9

FIELD-OF-SEARCH: 705/1, 705/5, 705/6, 705/7, 705/8, 705/9, 705/10, 705/13, 701/1, 706/905

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	5289368	February 1994	Jordan et al.	705/8
☐	5459656	October 1995	Fields et al.	705/7
☐	5541835	July 1996	Dextraze et al.	705/10

OTHER PUBLICATIONS

Singh, V.K., et al., "Operation Research for Estimation of an Ambulance Requirement in a Hospital," Computer Methods and Programs in Biomedicine, vol. 33, 1990, pp. 59-63.
Larson,Richard C., "Ambulamce Deployment With the Hypercube Queuing Model," Medical Instrumentation, vol. 16, No. 4, Jul.-Aug. 1982.
Baker, J.R., et al., "Determination of an Optimal Forecast Model for Ambulance Demand Using Goa; Programming," Journal of the Operational Research Society, vol. 37, No. 11, 1986, pp. 1047-1059.
Kvalseth, Tarold O., et al., "A Demand Model for Emergency Ambulance Service in an Urban Area," Int Conf on Cybern and Soc, Nov. 5-7, 1973, pp. 176-177. Available from IEEE (73 CHO 799-7 SMC).
Tandberg, Dan, et al., "Time Series Forecasts of Ambulance Run Volume," The American

Journal of Emergency Medicine, May 1998, pp. 232-237.

ART-UNIT: 271

PRIMARY-EXAMINER: Trammell; James P.

ASSISTANT-EXAMINER: Morgan; George D.

ATTY-AGENT-FIRM: Arant; Gene W. Baker; Larry D.

ABSTRACT:

A method of forecasting the demand for ambulance services based upon a determination from the historical record of the number of currently active calls at the time each new call is received. The method may utilize records of specific calls history including the time each call was received and the time each call was completed, or it may use information on the number of calls received each hour to simulate specific calls history. The method may be extended to a "third dimension" to better account for the effect of service demands and staffing levels in preceding hours. The method has application to other services having the characteristics of limited available service resources, randomly occurring service requests but historically-repeating levels of demand, and relatively long service times.

5 Claims, 7 Drawing figures

WEST

Generate Collection Print

L6: Entry 2 of 6 File: USPT May 2, 2000

DOCUMENT-IDENTIFIER: US 6058370 A
TITLE: Method of forecasting ambulance service demand

Application Filing Date (1):
19980901

Detailed Description Text (5):
The active calls table 224 may be generated from specific calls history 214 contained in an historical database 210, or, if such information not available, specific calls history may be simulated 222 from a record of calls per time period 212.

Detailed Description Text (6):
By simulating the number of calls that would have been active for different hypothetical staffing levels, based on the actual specific calls history 214 and historical profiles of response and service times 216, the method of the present invention may be extended to a "third dimension", resulting in a response availability "cube" 234 that provides greater insight into the effect of staffing levels during the preceding hours. This "cube" may also be used as an input for resource allocation and scheduling.

Detailed Description Text (26):
Referring again to FIG. 2, creating a response availability "cube" is done by taking the actual call-received times from the specific calls history 214, and simulating an active calls table for various previous-hour staffing levels. Historical information 216 concerning out-of-chute times, travel times, and service times at different times of the day and day of the week are used in the simulations. When, in the simulation, a unit is not available to be sent on a call, the call is placed in a queue until a vehicle becomes available.

Current US Cross Reference Classification (3):
705/7

Current US Cross Reference Classification (4):
705/8

Current US Cross Reference Classification (5):
705/9

WEST

Generate Collection Print

L6: Entry 4 of 6 File: USPT Sep 29, 1998

US-PAT-NO: 5815417
DOCUMENT-IDENTIFIER: US 5815417 A

TITLE: Method for acquiring and presenting data relevant to an emergency incident

DATE-ISSUED: September 29, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Orr; Wilson W.	Mayer	AZ		
Miller; Raymond M. P.	Scottsdale	AZ		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
City of Scottsdale	Scottsdale	AZ			02

APPL-NO: 08/ 900177 [PALM]
DATE FILED: July 25, 1997

PARENT-CASE:
CROSS-REFERENCE TO RELATED APPLICATIONS The present application is a continuation-in-part application of an application entitled "APPARATUS AND METHOD FOR COLLECTING, ANALYZING AND PRESENTING GEOGRAPHICAL INFORMATION", filed Oct. 22, 1996 and assigned Ser. No. 08/735,336, now U.S. Pat. No. 5,652,717 issued Jul. 29, 1997, which is a continuation of application Ser. No. 08/285,830, filed Aug. 4, 1994, now abandoned, and describing an invention of the present inventors.

INT-CL: [06] G06 T 17/50

US-CL-ISSUED: 364/578; 395/208, 340/506
US-CL-CURRENT: 703/5; 340/506, 705/8

FIELD-OF-SEARCH: 364/578, 364/564, 364/512, 364/413.3, 324/323, 395/208, 395/920, 395/933, 422/900, 434/226, 434/219, 340/500, 340/506, 340/515, 340/539, 340/525

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	4670739	June 1987	Kelly, Jr.	340/539
☐	4868771	September 1989	Quick et al.	364/578
☐	4890249	December 1989	Yen	364/578
☐	5005147	April 1991	Krishen et al.	364/578
☐	5219290	June 1993	Lapp et al.	434/226
☐	5307292	April 1994	Brown et al.	364/564
☐	5329464	July 1994	Sumic et al.	364/512
☐	5375074	December 1994	Greenberg et al.	364/578
☐	5414408	May 1995	Berra	340/525
☐	5433612	July 1995	Daku	434/226
☐	5652717	July 1997	Miller et al.	364/578
☐	5726884	March 1998	Sturgeon et al.	395/209

OTHER PUBLICATIONS

"A Three-Dimensional/Stereoscopic Display and Model Control System for Great Lakes Forecasts", by C. Yen, K. Bedford, J. Kempf and R. Marshall, IEEE Visualization Conference, 1990, pp. 194-201.
"Visualizing n-Dimensional Implications of Two-Dimensional design Decisions", by S. Ervin, IEEE Visualization Conference, 1992, pp. 356-360.
"Computer-Aided Modeling for Interference Analysis in Urban Areas", by T. Mizuike et al, Globecom '92: IEEE Global Telecommunications Conference, 1992, pp. 1858-1864.
"Machine Learning from Remote Sensing Analysis", by D. Charebois, D. Goodenough and S. Matwin, IEEE, Remote Sensing for the Nineties, 1993 (IGARSS), pp. 165-172.
"ADSM--An Automated Distribution System Modeling Tool for Engineering Analyses", by X. Wei, Z. Sumic and S. Venkata, IEEE, Transmission and Distribution Conference, 1994, pp. 46-52.
"Geographic Information Systems: Are they Decision Support Systems?", by L. Murphy, IEEE, System Sciences, 1995 Annual Hawaii Int'l Conference, vol. IV, pp. 131-140.

ART-UNIT: 273

PRIMARY-EXAMINER: Teska; Kevin J.

ASSISTANT-EXAMINER: Frejd; Russell W.

ATTY-AGENT-FIRM: Cahill, Sutton & Thomas P.L.C.

ABSTRACT:

A method for resolving an emergency incident is described which is capable of providing projected results and effects based upon varying the inputted data as a function of the consequences of presently made or proposed decisions by the decisionmakers. Sources of data collected from a plurality of sources are converted into an electronic database which may be automatically and/or periodically updated during the course of the emergency incident. A series of software modules utilizes the data for a series of specific applications to reduce the public risk. The output provided by modeling and simulation modules may be in the form of two-dimensional or three-dimensional visual presentations in specially equipped multiple, computer-driven screens at a command center.

24 Claims, 5 Drawing figures

L6: Entry 4 of 6 File: USPT Sep 29, 1998

DOCUMENT-IDENTIFIER: US 5815417 A
TITLE: Method for acquiring and presenting data relevant to an emergency incident

Application Filing Date (1):
19970725

Brief Summary Text (7):
The present invention is directed to an advanced remote data sensing capability coupled with an emergency incident support system which can access remote sensed data to automatically acquire event related data in real time. The data may be processed for immediate presentation or stored for later use. The system includes the capability for simulating a variety of outcomes based upon the development of the emergency incident and attendant dynamic factors. Risks to public safety and attendant costs can be balanced against a variety of projected outcomes. Furthermore, the current situation can be presented as an image using real time data or other renderings on any of a plurality of presentation screens. Three-dimensional imagery can be portrayed on a further screen to represent a predicted outcome based on each of a variety of simulated event scenarios. The ability to move in real time within a three-dimensional environment and to view each of the different incident scenarios provides an extremely realistic presentation to each decisionmaker at the command center. Further imagery may be provided to present a two-dimensional map of the area involved with a zoom capability to permit regional or detailed views on command. Various local regional and global data sources permit acquisition on command of accurate data relevant to each query made that will enhance and clarify presentation of the factual situation to each decisionmaker. The tremendous amount of real time data available coupled with the capability for developing simulated scenarios will simplify the decisions that must be made to resolve complex inter-related problems attendant an emergency incident and thereby mitigate public risk.

Brief Summary Text (8):
It is therefore a primary object of the present invention to provide a method for making available to a command center during an emergency incident real time data and capability for simulating various scenarios based upon such data to make complex decisions with minimal public risk.

Current US Cross Reference Classification (2):
705/8

WEST

End of Result Set

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L6: Entry 6 of 6 File: USPT Oct 19, 1993

US-PAT-NO: 5255181
DOCUMENT-IDENTIFIER: US 5255181 A
**** See image for Certificate of Correction ****

TITLE: Method of planning organizational activities

DATE-ISSUED: October 19, 1993

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Chapman; William	Scottsdale	AZ		
Capen; William	Phoenix	AZ		
Chang; Gwo-Jer	Mesa	AZ		
Handorf; Christopher	Mesa	AZ		
Raman; Anant	Chandler	AZ		
Sevak; Ajay	Tempe	AZ		
Venkatesh; Kolur	Chandler	AZ		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
Motorola, Inc.	Schaumburg	IL			02

APPL-NO: 07/ 532306 [PALM]
DATE FILED: June 1, 1990

INT-CL: [05] G06F 15/22, G06F 15/24, G06G 7/52

US-CL-ISSUED: 364/401; 364/468
US-CL-CURRENT: 705/8; 700/99, 705/9

FIELD-OF-SEARCH: 364/401, 364/468

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected | Search ALL

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	3703725	November 1972	Gomersall et al.	444/1
☐	3845286	October 1974	Aronstein et al.	235/151.1
☐	4208712	June 1980	Deutsch	364/105
☐	4517375	May 1985	Cassell	364/138
☐	4591983	May 1986	Bennett et al.	
☐	4628434	December 1986	Tashiro et al.	364/130
☐	4635182	January 1987	Hintz	364/138
☐	4648023	March 1987	Powell	364/156
☐	4670848	June 1987	Schramm	364/513
☐	4697242	September 1987	Holland et al.	364/513
☐	4807108	February 1989	Ben-Arieh et al.	364/148
☐	4827423	May 1989	Beasley et al.	364/468
☐	4896269	January 1990	Tong	364/468
☐	5111404	May 1992	Kotani	364/468

OTHER PUBLICATIONS

Chapman, "Manufacturing Control and Capacity Planning", 1987, Intl. Electronic Manufacturing Tech. Symposium.

ART-UNIT: 231

PRIMARY-EXAMINER: Envall, Jr.; Roy N.

ASSISTANT-EXAMINER: Bai; Ari M.

ATTY-AGENT-FIRM: Barbee; Joe E.

ABSTRACT:

A method for translating complex process flow networks into plans or schedules for the manufacturing of products or the performance of other organizational activities is disclosed. The method maintains a time-valued list of existing commitments to resources. Allocations of these resources are made to lots during a simulation procedure which calculates a resulting plan's timing data. The method simulates higher priority lots before it simulates lower priority lots. A simulation evaluates the process flow description to obtain the relative order of consuming and releasing resources, resource attributes and related capabilities, initial minimum timing requests, and process control rules. The simulation uses the list to determine when resources may be used without impacting prior commitments of the resources. In addition, the simulation forces the allocations to conform to the process control rules. The resulting timing data is merged into the processing plan, and resource commitments are then made to the simulated resource. When lower priority lots are simulated, commitments have already been made to higher priority lots. Thus, the lower priority lots cannot receive resource allocations which impact the higher priority lots. However, the lower priority lots may receive allocations which occur prior to contending allocations to higher priority lots.

18 Claims, 14 Drawing figures

WEST

End of Result Set

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L6: Entry 6 of 6 File: USPT Oct 19, 1993

DOCUMENT-IDENTIFIER: US 5255181 A
**** See image for Certificate of Correction ****
TITLE: Method of planning organizational activities

Application Filing Date (1):
19900601

Detailed Description Text (49):
Process 5 specifies that the cookies are to be baked in an oven "A" for 45 minutes. In addition, Process 5 specifies the temperature at which the cookies are to bake, and other relevant attributes, such as the number of oven shelves needed in oven "A" to bake the cookies. If Process 6 incorporates process description 1 listed in TABLE III above, then it specifies that an oven "B" be used to bake the cookies for 25 minutes at a specified temperature. For the purposes of the example process flow description presented in FIG. 3, Processes 5-6 are generally equivalent to one another, and one of Processes 5-6 is selected by evaluating the branch selection rule included in Branch 3. Thus, Branch 3 may include a rule which specifies that the sub-flow path with the fastest completion time to Branch 4 (see rule 1 in TABLE II) be selected. Such a rule is considered a "backwards" rule. The present invention will simulate both sub-flow paths and then look backward within the process flow and choose whichever one of Processes 5-6 achieves the quickest completion time. Thus, if oven "A" is allocated to another lot, the simulation will pick Process 6; and, if oven "B" is allocated to another lot, the simulation will pick Process 5. However, if both are simulated as being available, the simulation will select Process 6 because of a shorter cooking time.

Current US Original Classification (1):
705/8

Current US Cross Reference Classification (2):
705/9

CLAIMS:

13. A method as claimed in claim 9 additionally comprising, prior to said simulating step, the step of forming a list which identifies time-valued commitments to future uses of said resources, and wherein said simulating step comprises the step of obtaining, from said list, data describing time slots during which said resources are available for use.

Hit List

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Search Results - Record(s) 1 through 5 of 5 returned.

☐ 1. Document ID: US 6671818 B1

L1: Entry 1 of 5 File: USPT Dec 30, 2003

US-PAT-NO: 6671818
DOCUMENT-IDENTIFIER: US 6671818 B1

TITLE: Problem isolation through translating and filtering events into a standard object format in a network based supply chain

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw De

☐ 2. Document ID: US 6606744 B1

L1: Entry 2 of 5 File: USPT Aug 12, 2003

US-PAT-NO: 6606744
DOCUMENT-IDENTIFIER: US 6606744 B1

TITLE: Providing collaborative installation management in a network-based supply chain environment

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw De

☐ 3. Document ID: US 6175948 B1

L1: Entry 3 of 5 File: USPT Jan 16, 2001

US-PAT-NO: 6175948
DOCUMENT-IDENTIFIER: US 6175948 B1

TITLE: Method and apparatus for a waveform compiler

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw De

☐ 4. Document ID: US 6044355 A

L1: Entry 4 of 5 File: USPT Mar 28, 2000

US-PAT-NO: 6044355

h e b b g e e e f e f g ef b e

DOCUMENT-IDENTIFIER: US 6044355 A

TITLE: Skills-based scheduling for telephone call centers

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

☐ 5. Document ID: US 5999908 A

L1: Entry 5 of 5 File: USPT Dec 7, 1999

US-PAT-NO: 5999908
DOCUMENT-IDENTIFIER: US 5999908 A

TITLE: Customer-based product design module

Full | Title | Citation | Front | Review | Classification | Date | Reference | | | Claims | KWIC | Draw De

Clear | Generate Collection | Print | Fwd Refs | Bkwd Refs | Generate OACS

Terms	Documents
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L1: Entry 1 of 5 File: USPT Dec 30, 2003

US-PAT-NO: 6671818
DOCUMENT-IDENTIFIER: US 6671818 B1

TITLE: Problem isolation through translating and filtering events into a standard object format in a network based supply chain

DATE-ISSUED: December 30, 2003

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Mikurak; Michael G.	Hamilton	NJ		

US-CL-CURRENT: 714/4; 714/43, 714/48

ABSTRACT:

A system, method and article of manufacture are provided for life cycle network asset management in a network based supply chain. In accordance with an embodiment of the present invention, the supply chain network is monitored, and events from network assets are received, filtered, and correlated, whereby problems with network assets are further isolated. The filtered and isolated events problems are then translated into a standard object format for facilitating the determination of the life cycle of problem network assets, wherein the events are translated by a comprehensive library of all possible message types provided by the custom software interfaces. In accordance with an embodiment of the present invention, the network assets include both packet-switched and circuit-switched network assets, and the events are received by custom software interfaces which communicate directly with the network assets.

3 Claims, 144 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 130

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First Hit Fwd Refs

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L1: Entry 4 of 5 File: USPT Mar 28, 2000

US-PAT-NO: 6044355
DOCUMENT-IDENTIFIER: US 6044355 A

TITLE: Skills-based scheduling for telephone call centers

DATE-ISSUED: March 28, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Crockett; Gary B.	Plano	TX		
Leamon; Paul H.	McKinney	TX		

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY	TYPE CODE
IEX Corporation	Richardson	TX			02

APPL-NO: 08/ 890228 [PALM]
DATE FILED: July 9, 1997

INT-CL: [07] G06 F 17/30, H04 M 3/50

US-CL-ISSUED: 705/8; 705/9, 705/10, 379/113, 379/34, 379/112
US-CL-CURRENT: 705/8; 379/265.05, 705/10, 705/9

FIELD-OF-SEARCH: 705/8-10, 379/34, 379/92.04, 379/113, 379/134, 379/139, 379/140, 379/265-266, 379/309, 379/112, 379/92.03

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected | Search ALL | Clear

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	4510351	April 1985	Costello et al.	705/8
☐	5185780	February 1993	Leggett	379/34
☐	5289368	February 1994	Jordan et al.	705/8
☐	5325292	June 1994	Crockett	705/9

OTHER PUBLICATIONS

ACDs Get Skills-Based Routing --Klenke, Business Communications Review, Jul. 1995 pp. 48-51.

h e b b g e e e f c e f g e ge

ART-UNIT: 274

PRIMARY-EXAMINER: Trammell; James P.

ASSISTANT-EXAMINER: Nguyen; Cuong H.

ATTY-AGENT-FIRM: Judson; David H.

ABSTRACT:

A method for scheduling personnel (e.g., agents) in a work environment based on personnel "skill" levels. The method facilitates true skills-based scheduling of agents in a telephone call center using a simulation tool to predict what fraction of scheduled agents from each "skill group" will be available to each "call type" during each time interval being scheduled. A feedback mechanism is used to adjust net staffing and skills usage data between iterations of a call handling simulation until a given schedule being tested through the simulator meets some acceptance criteria.

20 Claims, 11 Drawing figures

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Refine Search

Search Results -

Terms	Documents
6044355.pn.	1

Database:
US Pre-Grant Publication Full-Text Database
US Patents Full-Text Database
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L1: Entry 5 of 5 File: USPT Dec 7, 1999

US-PAT-NO: 5999908
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TITLE: Customer-based product design module

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INVENTOR-INFORMATION:

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ABSTRACT:

The invention may be embedded in products or services that contain a microprocessor and a facility for communication. The resulting two-way interactive media enables relationships to be built with individual customers and groups of customers throughout a product's or service's life cycle. Customers may also be provided with automatic, portable in-use access to constantly updated information during product use, to increase user success and reduce costly and error-filled processes of acquiring product expertise. The invention may interact with customers, gather information from customers, communicate customer information securely to a vendor or external third party(ies), construct and transmit new pre-programmed interactions to the customer communications system in the product, and analyze and report customer information. This new medium provides a worldwide way to transform the use of products and services into interactive two-way dialogues; add in-product performance measures and any specific assistance needed; educate and train customers as their product uses change; permit vendors to discover and respond instantly to market shifts and opportunities; generate and test new ideas; enable customers to guide a vendor or a third party(ies) in satisfying their needs; and other means of using in-product communications to fit business operations with rapidly changing customers and markets. By making two-way learning and information delivery part of the product and service environment, vendors or third parties can become faster, more efficient and accurate in designing, delivering and supporting what customers want to buy.

37 Claims, 35 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 42

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ACDs Get Skills-Based Routing

Maggie Klenke

Call center managers as matchmakers: Which agents can best meet a caller's needs?

The goal of automated call distributor (ACD) technology has always been to spread incoming calls among call center agents so that each agent handled an equitable share of the load and the caller had the best chance of being served quickly. Now, a new kind of thinking—skills-based routing—has entered the call center arena. It takes ACDs one step further and ensures that an incoming call is routed to the available agent whose skills are best matched to the caller's needs.

Skills-based routing software typically comes in a new release/upgrade of PBX or ACD software. In some cases, additional peripheral systems, such as a voice response unit (VRU), may be required to perform the front-end sorting of incoming calls. It works by linking call center agents with predefined skills groups. This can be done in one of two ways:

1. Before an agent logs on, his or her skills are identified and linked to skills stored in a database within the system. When the agent logs on, the system automatically routes calls based on the information stored about the agents' skills.

2. Each time the agent logs on to the system, he or she manually creates a link to each of the appropriate skills groups.

There are two features that can be used separately or together to facilitate the process of matching the caller's needs to the best available agent. The first feature is the capability of the system to queue a call to more than one agent group at the same time.

Traditionally, ACDs can queue a call to only one group at a time. The routing pattern will, when certain parameters are exceeded—e.g., the number of calls already in queue for that group or the time calls are waiting in that group—look at other queues to determine if the service levels are better. When it finds an agent group with parameters below assigned thresholds, the call is moved from the queue for the initial agent group to the new queue.

The newer system feature allows the ACD to leave the call in queue with the initial group and continuously check or simultaneously queue the call in all of the other agent groups defined for it. This feature expands the pool of agents who might potentially handle the call. When this feature is used alone, each agent can be logged into only one group at a time, and skill sets must be defined by group.

The second feature allows an agent to be logged into more than one skills group at a time and assigns priorities to those groups. A skills group represents a set of capabilities that a specific call type requires such as billing expertise or product knowledge. This feature offers some control over the mixture of calls that an agent would take. For example, if an agent is logged into three skill groups and the first skill group consumes 75 percent of the total call load, the agent would probably experience a corresponding call load for that high-volume skill group even if no priorities were used.

However, this agent may have a unique skill, like technical knowledge or a language, that is possessed by only a few agents. The unique skill can be assigned a higher priority than more general skills, which results in a reduced number of calls from the high-volume skill group going to that agent.

In combination, these two features represent a highly complex situation in which a large number of variables interact to try to achieve the call center's goals. For example, when the system uses the queuing to multiple groups feature to expand the agent pool, it may not expand very much if the agents are logged in to the same skills groups. However, when agents represent a more varied mixture of skills, the same queuing to multiple groups feature will be much more effective.

Some ACD products—such as Expert Agent Selection (EAS) from AT&T (Basking Ridge, NJ), Skill Mapping from Aspect (San Jose, CA) and Matchmaker 3-Dimensional Routing from Rockwell (Downers Grove, IL)—offer the

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expanded complement of skills-based routing features, while others such as Nortel (Research Triangle Park, NC) and Siemens Rolm (Santa Clara, CA) are still working on product enhancements, which are expected soon. However, given the customer demand—especially from help desk users and outsourcers—it seems clear that this is the new call center "must have" feature and one that promises better overall service for all callers. There is no question that this is an attractive possibility. (For more on skills-based routing capabilities, see *Customer Service Excellence,* a supplement to this issue of *BCR.*)

Identifying Customer Needs

To make this possibility a reality, all of the unique kinds of needs that callers might have and the combinations of those needs that may occur must be determined. For example, let's assume that the call center is an appliance sales and repair center, which handles refrigerators, washers, dryers, microwave ovens and customer service billing and shipping inquiries. To add some complexity to the example, the company is located in an area where it is necessary to support both English- and Spanish-speaking callers.

Having call center agents who can speak either English or Spanish is the first customer need identified. Other caller needs will combine the language requirement with knowledge about the sales and repair of the various appliances. These combinations are called skills groups. Table 1 is an example of a customer requirement matrix.

In addition, it is possible that a bilingual customer would prefer to reach the next available agent in either language rather than wait specifically for a Spanish- or English-speaking agent. So there could be yet another nine bilingual combinations to accommodate these callers. There also might be some high-volume buyers like home construction companies that need to be prioritized —they go to the top of the queue when they call. Any and all reasons to handle a call differently should be identified and listed in the customer requirement matrix.

The next challenge is to determine what a customer is calling about *this* time, and here the availability of advanced voice processing technologies is useful. Just identifying the caller as a customer with a specific language preference—e.g., linking the automatic number identification (ANI) or calling line ID (CLID) to a customer database and forwarding the answer via a CTI link—is not enough. While the language preference can be identified from the customer profile, the customer could already have both a washer and dryer under service contract, be interested in buying a refrigerator or be a high-priority construction company buyer.

This necessitates some kind of sorting process. One option is to have different phone numbers for each type of question or caller. But making those numbers available to customers and the high potential for transfers due to confusion make this option a problem. Another possibility is to front-end the system with an automated attendant or a voice response/recognition unit. The caller can then be asked to identify which of the menu options best matches their inquiry. Using the current example, questions to ask include language preference (if not already determined), billing/shipping, sales or repair requests and the type of appliance (not necessarily in that order).

Assuming a willingness on the part of caller to deal with the machine, it is imperative that the scripts lead the caller to the correct option in a way which does not have them making a premature selection into the wrong agent group. It is usually best to put the options in the order they are most frequently requested. However, it is also smart to structure the order of options from specific to general. This ordering has the greatest potential of avoiding incorrect selections on the part of the customer.

Of course, some callers will choose to remain on the line (or press 0) and wait for a human to answer, and some percentage will select a key which does not correspond to any valid choice. In these situations, it must be determined which agent group should get the calls. For some applications, it may be appropriate to do "human triage" and have a group of agents route the calls instead of putting the caller through the machine process. While this may be more "customer friendly," it is also more expensive.

Defining Agent Skills

The next major task in setting up the skills-based routing process is to inventory the agent's skills. It is fair to say that some agents will have a higher skill level in some areas than others, but be capable of handling a call in either. So a level of skill capability also should be assigned—perhaps a first, a second and an only-if-desperate last choice. After all, the idea is to get the caller to the most

TABLE 1 Customer Requirement Matrix

Skill #	Skill Combination
1	English, refrigerator sales
2	English, refrigerator repairs
3	English, washer sales
4	English, washer repairs
5	English, dryer sales
6	English, dryer repairs
7	English, oven sales
8	English, oven repairs
9	Spanish, refrigerator sales
10	Spanish, refrigerator repairs
11	Spanish, washer sales
12	Spanish, washer repairs
13	Spanish, dryer sales
14	Spanish, dryer repairs
15	Spanish, oven sales
16	Spanish, oven repairs
17	English billing/shipping
18	Spanish billing/shipping

The idea is to get the caller to the most capable person in the center, not just anyone with a marginal skill

capable person in the center, not just anyone with a marginal skill. (One of the benefits of finding the most capable agent may be a shorter handle time.)

Once this inventory is complete, a matrix can be built that links agent skills to caller needs. A matrix of 10 agents and 11 customer requirements or skills groups is shown in Table 2.

The first pass at this matrix results in an uneven distribution of agents to skills. Of the 11 possible skills groups, some agents have as few as two and others as many as seven. This is further complicated by the particular capabilities of some ACDs. For example, an ACD may restrict an agent from logging into more than three or four skill groups at the same time. So it would be impossible to take advantage of some those skills possessed by more experienced agents.

To get around this ACD limitation, customer need categories can be combined to create new skills groups and thereby take advantage of individual agent skill combinations. For example, there could be a skills group for English-speaking customers wanting to purchase any of the appliances. That would suit agents Mary and Lucy in Table 2 very well. They could log into that skills group and function as secondaries on billing/shipping and still use all of their skills.

However, it may require more management effort to create skills groups specifically tailored to the capabilities of each agent in the call center. This could lead to the need for each new hire or newly trained agent to have a skills group designed just for them.

It should be noted that the ideal agent for a specific job vacancy may not be the one who possesses all of the skills at the highest level. Agents with only some skills may be more readily available at lower wage rates. This skills-based routing capability allows for the more efficient use of agents with varying degrees of skills.

The agent skills matrix will often reveal that there are caller needs for which there are no agent skills. This is why it is important to identify caller needs first and agent skills second. It is far better to hire or train agents to meet callers' needs rather than to pigeonhole customers into a narrow list of options derived from agent skills.

In addition, if no agents are available for a particular group of caller needs, it may be wise to keep the category anyway and create a group without any agents as long as there is some other skills group combination staffed to handle these calls. This allows the design of the routing tables to be done once and remain fairly stable as agents are added to the staff.

Putting It All Together

The last step is to set up a routing scheme that allows the caller and the agent to come together efficiently. A routing pattern for agent selection within a skills group should be set up to maximize the caller's chances of getting the most skilled agent available, while making efficient use of agent personnel.

When setting up this pattern, it's not a good idea to overwork the most skilled agents and leave the least skilled agents idle. Further complicating this task, call volumes for different kinds of inquiries are likely to vary. It is generally desirable to balance out the workload for all agents in the center—if possible—and still protect the very unique skills possessed by only a few agents so they will be available when a caller needs them.

A balanced workload can be partly accomplished by assigning priorities that specify which agents are first, second, etc., choices for certain types of calls. Certain caller types, like the construction company buyers, can be assigned a priority as they enter a queue so that they go ahead of others in that queue.

Queue management is also a critical consideration. The depth of the queue needs to be taken into account when a call is routed so that a caller is not forced to wait through a time-out period unnecessarily before looking at other choices.

Given the option to identify an agent's level of skill for any particular call type, how can the most skilled agents be kept from being overworked?

TABLE 2 Agent Skills Matrix

Agent	English	Spanish	Refrigerator Sales	Refrigerator Repair	Washer Sales	Washer Repair	Dryer Sales	Dryer Repair	Oven Sales	Oven Repair	Billing Shipping
Mary	1		1		1		1		1		2
Betty	1	1	1	3					1	3	
Susie	1			1		1		1		1	3
Beth	1	2			1	3	1	3			1
Charles	1		2		2		2		2		1
Bob	1	3		1		1		1		1	
Lucy	1		1		1		1		1		2
Luis	2	1				1		1			3
Gail	1		1	2					1	2	1
Joe	1										1

Key: 1 = Highly Skilled; 2 = Medium Skilled; 3 = Trainee/Low Skilled

One option is to accept this load imbalance and to compensate highly skilled agents for the workload disparity. In any case, queue levels will need to be monitored carefully.

Generally, the routing pattern needs to seek an agent within a skills group in an way that recognizes the number of skills each agent possesses. For example, if an agent speaks only English and can handle only inquiries about billing/shipping questions, then this agent should be the first choice for callers matching this need. Only if this agent is unavailable would the routing pattern seek a bilingual billing/shipping agent, or any other agent with the needed skill combinations. This keeps the minimally skilled agents busy and helps to reserve the highly skilled agents for more unique calls.

However, this is not a panacea, as call volumes and agents who are logged in continually change. Therefore, constant monitoring of the operation and shifting of the routing patterns and agent assignments may be necessary to achieve the full value of skills-based routing.

The dark side of the skills-based routing feature is that there are few automated tools to make this process easier for the call center manager. The agent skills matrix and the routing pattern are designed by brute force, and when an agent is hired, fired or trained in a new skill, calls in sick or goes to a meeting, or when caller needs change, these also must be changed.

In addition, external forces such as call center reorganization or the addition of a new product or service will also cause the agent skills matrix and the routing pattern to change. It is important that users of this feature understand these limitations before implementation. While it may not be too difficult to manage skills-based routing for the call center in this example, imagine the challenge of managing one for hundreds of agents and many call types.

Traditional tools for scheduling will need to be modified to deal with this new kind of environment as well. That change must recognize, more clearly than is normally done at present, the long-range vs. short-range scheduling issues. On a long-range basis, an effort must be made to ensure a reasonable coverage of scarce skills.

For short-range scheduling, like for the next day, more detailed planning can be done, since more information is available about the agents that will actually be there throughout the day. At this point, a simulator will be needed to help adjust individual employees' skill assignments and, to a lesser degree, their schedules so that optimal coverage is provided. The concept of creating an optimal set of schedules for a long period is meaningless, for all practical purposes.

Planning Checklist: Questions to Ask Your Vendor

1. How many skills can an agent be assigned to concurrently?
2. Can each agent identify a level of skill or preference for each skills group he or she logs into?
3. How many total skills are available in the system?
4. How does an agent log into multiple skills?
5. Does the agent or the manager control the set of skills and priorities defined for each agent ID?
6. Can a call be queued against multiple skills groups concurrently and, if so, how many?
7. What conditional variables are available in the routing pattern (e.g. ANI, DNIS, time in queue, agents available, etc.)?
8. How will the real time and historical reports account for:
   a. Agent time utilization.
   b. Positions staffed for a skill.
   c. Wait time or available time.
   d. After call work time.
   e. Non-ACD work time.
   f. Outbound call time.
9. How would skills-based routing be applied in a CTI environment?
10. What tools are provided to identify caller needs? (Unless caller needs are identified, there is little point in skills-based routing).
11. What current features of your system would be modified by the implementation?
12. How would this capability be implemented in a multi-site environment?
13. How are number of calls offered and average handle time for each call type reported for each skills group?

Conclusion

The new capabilities for skills-based routing require a shift in thinking when designing an incoming call center. It is no longer enough to simply consider a few general call types and then assign agents to handle those call types regardless of their depth of skills.

Now, complex patterns can be set up that make better use of agent skills and accommodate individual caller preferences and needs. This should provide both higher customer satisfaction and greater efficiencies. But it is not as simple as the old method, and the planning effort will be exceeded only by the need to keep the agent skills database, the customer needs list and routing tables up-to-date. Each time an agent quits, is hired or goes to a training class for a new skill, a new product is offered or the call volume on a mature product shrinks, the system parameters will need to be adjusted.

While the voice processing vendors are cheering its arrival all the way to the bank, this is clearly not a feature for the faint of heart. As additional technical capabilities are developed, the challenge for the ACD vendors will be to provide easy-to-use management systems and statistical packages that will make it simple for the call center manager to take full advantage of the products' capabilities. Hopefully, skills-based routing will help serve customers better and increase profitability along the way as well□